

What is claimed:

- 1 1. A system for withdrawing permeate from a substrate, said system comprising:
2 a vessel configured to contain substrate;
3 two or more compartments configured to receive substrate from said vessel and
4 to return a portion of received substrate to said vessel;
5 a filter positioned at least partially within each of said compartments and
6 configured to separate permeate from substrate during operation of said filter;
7 at least one of said compartments being configured to contain cleaning solution
8 and substantially prevent cleaning solution from contacting substrate in said vessel
9 during cleaning of said filter; and
10 said system being configured for cleaning said filter in situ in at least one of said
11 compartments while operating said filter in at least one other of said compartments.
- 1 2. The system recited in claim 1, further comprising a source of cleaning
2 solution configured to introduce cleaning solution into said compartments and into
3 contact with said filter in said compartments.
- 1 3. The system recited in claim 1, each of said compartments having an
2 opening for discharge of cleaning solution or substrate from said compartment.
- 1 4. The system recited in claim 1, at least one of said compartments being
2 positioned at least partially within said vessel.
- 1 5. The system recited in claim 1, further comprising a diffuser positioned
2 within at least one of said compartments for receiving substrate delivered from said
3 vessel and for introducing received substrate into said compartment.
- 1 8. The system recited in claim 1, at least one of said compartments defining
2 an opening through which received substrate returns to said vessel.
- 1 9. The system recited in claim 8, said opening being positioned at a top
2 portion of said compartment.
- 1 10. The system recited in claim 1, said filter being configured to be
2 submerged in substrate during operation.

1 11. The system recited in claim 10, said filter being positioned completely
2 within an interior of at least one of said compartments.

1 12. The system recited in claim 1, further comprising a tank connected to
2 receive permeate separated by said filter.

1 13. The system recited in claim 1, further comprising a permeate discharge
2 positioned at an elevation below said filter such that atmospheric pressure causes
3 permeate to flow from said filter toward said permeate discharge.

1 14. The system recited in claim 1, wherein at least two of said compartments
2 are positioned adjacent one another.

1 15. The system recited in claim 14, said compartments being defined by a
2 compartment divided into two or more sub-compartments configured to receive
3 substrate from said vessel and to return a portion of received substrate to said vessel.

1 16. The system recited in claim 15, wherein a filter is positioned at least
2 partially within each of said sub-compartments.

1 17. A system for withdrawing permeate from a substrate, said system
2 comprising:

3 a vessel configured to contain substrate;

4 two or more compartments positioned at least partially within said vessel, said
5 compartments being configured to receive substrate from said vessel and to return a
6 portion of received substrate to said vessel;

7 a filter positioned at least partially within each of said compartments and
8 configured to separate permeate from substrate during operation of said filter;

9 at least one of said compartments being configured to contain cleaning solution
10 and substantially prevent cleaning solution from contacting substrate in said vessel
11 during cleaning of said filter; and

12 said system being configured for cleaning said filter in situ in at least one of said
13 compartments while operating said filter in at least one other of said compartments.

1 18. A method for withdrawing permeate from a substrate using a filtration
2 system, said method comprising the steps of:

3 (a) introducing substrate from a vessel into two or more compartments for
4 contact with a filter positioned at least partially within each of the compartments;

5 (b) returning a portion of received substrate from the compartments to the
6 vessel;

7 (c) cleaning a filter associated with at least one of the compartments in situ;
8 and

9 (d) operating a filter associated with at least one other of the compartments,
10 thereby withdrawing permeate from substrate received in the compartment through the
11 operating filter.

1 19. The method recited in claim 18, said cleaning step further comprises the
2 steps of:

3 (a) introducing a cleaner into the compartment or filter;

4 (b) preventing cleaner from contacting substrate in the vessel;

5 (c) cleaning a filter associated with at least one of the compartments; and

6 (d) at least partially submerging the filter to at least partially clean the filter,
7 all while maintaining the filter in situ.

1 20. The method recited in claim 19, said submerging step comprising
2 positioning the filter completely within the interior of the compartment.

1 21. The method recited in claim 19, said cleaning step further comprising the
2 step of draining cleaner from the compartment.

1 22. The method recited in claim 18, said cleaning step and said operating step
2 being conducted substantially concurrently to facilitate continuous operation of the
3 filtration system while at least one of the filters is being cleaned.

1 23. The method recited in claim 18, said cleaning step further comprises the
2 step of preventing flow of substrate into the compartment from the vessel.

1 24. The method recited in claim 18, said cleaning step further comprising the
2 step of introducing permeate, a chemical solution, or a combination of permeate and a
3 chemical solution into the compartment or filter.

1 25. The method recited in claim 18, said returning step comprising returning a
2 majority of received substrate from the compartment to the vessel.

1 26. The method recited in claim 18, further comprising the step of maintaining
2 the ratio of returned substrate to permeate at about 5:1.

1 27. The method recited in claim 18, further comprising the step of mixing
2 substrate in the vessel.

1 28. The method recited in claim 18, said returning step comprising circulating
2 received substrate adjacent to the filter to reduce the formation of a film on the filter.

1 29. The method recited in claim 18, further comprising the step of returning to
2 the filter a portion of permeate for reverse flow through the filter.

1 31. The method recited in claim 29, said step of returning permeate to the
2 filter being performed periodically.

1 32. The method recited in claim 18, said cleaning step comprising introducing
2 cleaner into the compartment through the filter.

1 33. A method for adapting a filtration system for cleaning thereof, said
2 filtration system being configured to remove permeate from substrate contained in a
3 vessel, said method comprising the steps of:

4 (a) positioning at least one compartment to receive substrate from the vessel
5 and to return a portion of received substrate to the vessel;

6 (b) positioning a filter at least partially within the compartment for separating
7 permeate from substrate during operation of the filter; and

8 (c) configuring the compartment to contain cleaning solution and
9 substantially prevent cleaning solution from contacting substrate in the vessel during
10 cleaning of the filter.

1 34. The method recited in claim 33, said compartment positioning step
2 further comprising the step of positioning the compartment at least partially within the
3 vessel.